TOVMASYAN, N.Ye.

Boundary value problems for a Tricomi equation with discontinuous boundary conditions. Sib. mat. zhur. 4 no.2:391-407 Mr-Ap '63. (MIRA 16:3)

(Boundary value problems) (Differential equations)

TOVMASYAN, N. Ye.

Dissertation defended for the degree of Candidate of Physicomathematical Sciences at the Joint Scientific Council on Physicomathematical and Technical Sciences; Siberian Branch

"Several Boundary Problems for the Trikomi Equation and the Laplace Equation Under Discontinuous Boundary Conditions."

Vestnik Akad. Nauk, No. 4, 1963, pp 119-145

S/199/63/004/002/008/013
B112/B234

AUTHOR: Tovmasyan, N. Ye.

TITLE: Boundary value problems for Tricomi's equation with discontinuous boundary conditions

PERIODICAL: Sibirskiy matematicheskiy zhurnal, v. 4, no. 2, 1963, 391-407

TEXT: The equations $y^m\partial^2u/\partial x^2 + \partial^2u/\partial y^2 = 0$ $(-2 < m < \infty)$ (1) and $\partial^2u/\partial x^2 + y^m\partial^2u/\partial y^2 = 0$ $(2 < m < \infty)$ (2) are considered in a connected domain D whose boundary Γ consists of the interval $-1 \leq y \leq 1$ and a Jordan curve σ joining the points A(-1,0) and B(1,0). The boundary data are assumed to be discontinuous at a finite number of points of the interval AB. Theorems of existence of solutions are derived which may be regarded as generalizations of known theorems concerning Tricomi's equation. In addition, the point singularities of the solutions to the equation $\partial^2u/\partial x^2 + \partial^2u/\partial y^2 + (k/y)\partial u/\partial y = 0$ (3) on the axis $y = 0$ are investigated.

SUBMITTED: July 22, 1961

Card 1/1

TOVMASYAN, N.Ye.

Some boundary value problems for Laplace's equation with discontinuous boundary conditions. Sib. mat. zhur. 5 no.1: 174-185 Ja-F '64. (MIRA 17:7)

ACCESSION NR: AP4012349 S/0199/64/005/001/0174/0185

AUTHOR: Tovmasyan, N. Ye.

TITLE: Certain boundary-value problems for the Laplace equation with discontinuous boundary conditions

SOURCE: Sibirskiy matematicheskiy zhurnal, v. 5, no. 1, 1964, 174-185

TOPIC TAGS: Laplace equation, boundary value problem, boundary condition, discontinuous boundary condition, Dirichlet problem, Neumann problem

ABSTRACT: The paper considers the Dirichlet and Neumann problems for the Laplace equation in an n-dimensional region D, when the boundary conditions have singularities on a closed and uniformly dense set Γ of points on the boundary S. The solutions of the Dirichlet and Neumann problems under such boundary conditions are sought in a class of functions which are continuous everywhere in a closed region $\bar{D}$, except perhaps at points of the set Γ, and having on Γ singularities of specified form. In such a class of functions, the homogeneous Dirichlet and Neumann problems have an infinite number of linearly independent solutions. These problems are of importance in the study of electromagnetic fields or heat distribution. The paper also gives supplementary conditions for the solution of the Dirichlet problem, which ensure the existence and uniqueness of the solution in this class

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ACCESSION NR: AP4012349

of functions. Finally, analogous questions for the Neumann problem are considered. During the course of the article, 8 theorems are proven. "The author would like to thank A. V. Bitsadze and S. A. Tersenov for their valuable comments on reading of the manuscript." Orig. art. has: 27 numbered equations.

ASSOCIATION: none

SUBMITTED: 20Jul62 DATE ACQ: 26Feb64 ENCL: 00

SUB CODE: MM NO REF SOV: 003 OTHER: 001

Card 2/2

TOVMASYAN, N.Ye.

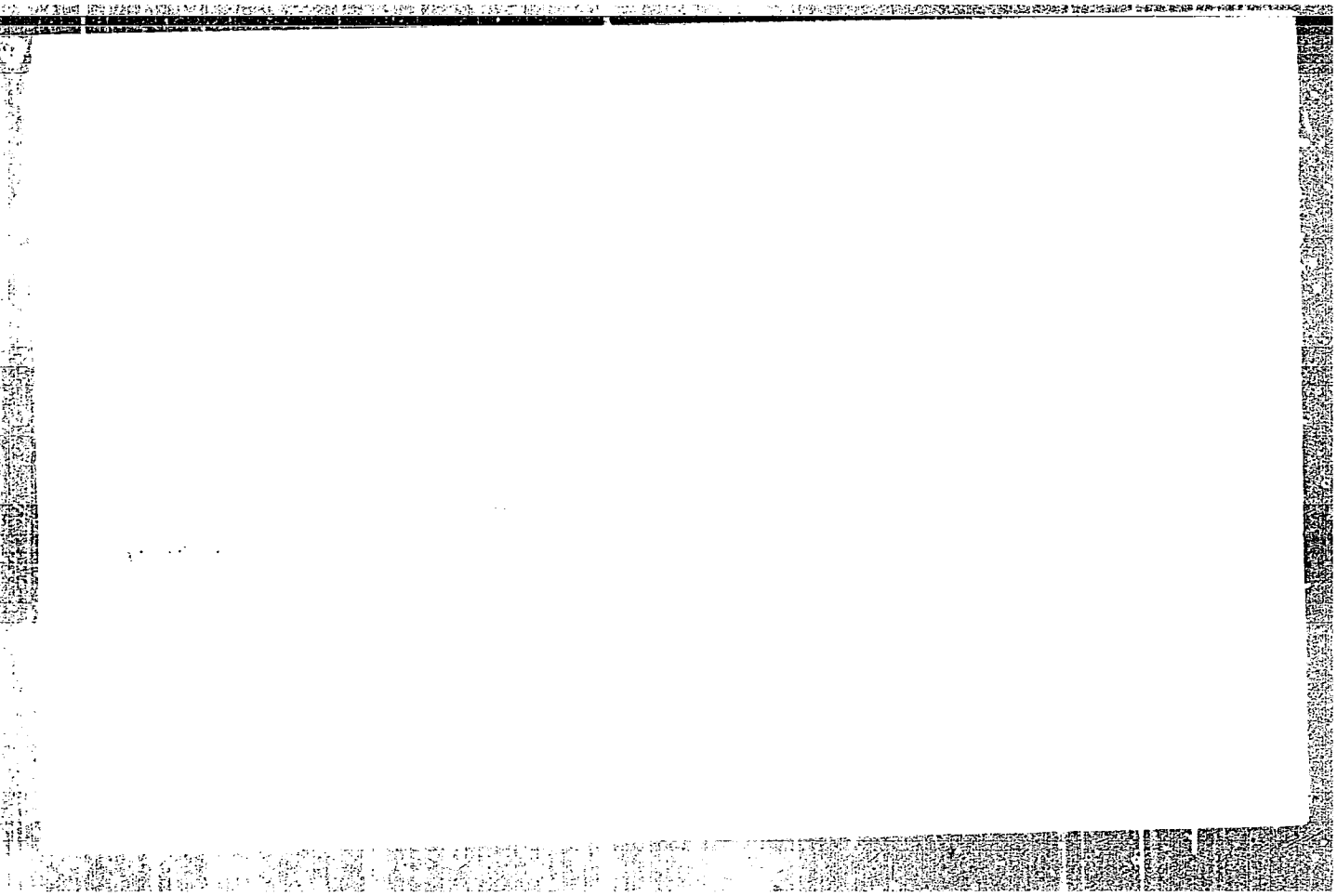
Some boundary value problems for systems of elliptic equations of the second order on a plane. Dokl. AN SSSR [illegible] no.[illegible]:[illegible] F '65. (MIRA [illegible])

1. Institut matematiki Sibirskogo otdeleniya AN SSSR. Submitted August 10, 1964.

TOVMASYAN, N.Ye.

A boundary value problem for an elliptic system of differential equations of the second order on a plane. Dokl. AN Arm. SSR 40 no.2:65-69 '65. (MIRA 18:5)

1. Submitted August 28, 1964.



general condition with that of a. [illegible]

41, 1961) for (1), (2) to be Noetherian in any simply connected region. If his condition is violated, then he proves that there is a region of arbitrarily smooth boundary in which (1), (2) is not Noetherian, even if f is infinitely differentiable. Orig. art. has: 9 formulas.

TOVMASYAN, N.Ye.

Some boundary value problems for systems of elliptic equations of the second order not satisfying I.A. Lopatinskii's condition. Dokl. AN SSSR 160 no.5:1028-1031 F '65. (MIRA 18:2)

1. Institut matematiki Sibirskogo otdeleniya AN SSSR. Submitted August 10, 1964.

L 10137-67 EWT(d)/EWP(l) IJP(c)
ACC NR AT6033117 SOURCE CODE: UR/0199/66/007/004/0920/0938

AUTHOR: Tovmasyan, N. Ye.

ORG: none

TITLE: Dirichlet problem for the elliptic systems of differential equations of the second order which do not satisfy the Yu. B. Lopatinskiy condition

SOURCE: Sibirskiy matematicheskiy zhurnal, v. 7, no. 4, 1966, 920-938

TOPIC TAGS: elliptic differential equation, vector function

ABSTRACT: The author discusses the twice differentiable in the region D solution of the system $L(u) \equiv Au_{xx} + 2Bu_{xy} + Cu_{yy} + a(z)u_x + b(z)u_y + c(z)u = h(x, y)$, (1), which belongs to the class $C^{\alpha 1}(\bar{D})$ and satisfies the boundary condition

$$u|_\Gamma = f, \quad (2)$$

where $z = x + iy$, $u = (u_1, \ldots, u_n)$ is the unknown vector function; $f = (f_1, \ldots, f_n)$ and $h = (h_1, \ldots, h_n)$ are given real vector functions in Γ and $\bar{D}$, respectively; A, B, C are real constant matrices of the order n; a(z), b(z), c(z) are real quadratic matrices of the order n in D. The system (1) is called elliptic, if $\det C \neq 0$ and the characteristic equation

$$\det (A + 2B\lambda + C\lambda^2) = 0 \quad (3)$$

UDC: 517.946

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has no real roots. The author discusses the case when Eq. (3) has only simple roots. Let $\lambda_1, \ldots, \lambda_n$ be the roots of Eq. (3) with positive imaginary parts, and δ_k the n-dimensional vector which is the solution of the algebraic equation

$$(A + 2B\lambda_k + C\lambda_k^2)\delta_k = 0. \quad (5)$$

Then the Lopatinskiy condition for the present problem is stated as follows: the vectors $\delta_1, \ldots, \delta_n$ must be linearly independent. The author analyzes the problem when this condition is not fulfilled and shows that the solubility of the system (1) and (2) depends on the coefficients a(z), b(z), c(z) which must be subjected to certain conditions. Orig. art. has: 78 equations.

SUB CODE: 12/ SUBM DATE: 04Jan65/ ORIG REF: 005

TOVMASYAN, O.V.

Vegetative hybridization of barley. Trudy Inst. gen. no. 27:142-144 '60. (MIRA 13:12)
(Barley) (Grafting)

USSR/General Biology - Genetics. Genetics of Plants. B

Abs Jour : Ref Zhur Biol., No 6, 1959, 23663

Author : Tovmasyan, O.V.

Inst : Academy of Sciences, Armenian SSR

Title : The Inheritance of Characteristics of Two Pollinizers in Corn.

Orig Pub : Izv. AN ArmSSR, Biol. i s.-kh. n., 1957, 10, No 4, 53-60

Abstract : The author has pollinated corn with a mixture of pollen of two kinds with different staining of seeds. From his obtained results, he concludes that the degree of manifestation of characteristics of two pollinizers in each separate ear and in various plants and under different methods of pollinization appear unequally. The individual reaction of plants to the process of fertilization, which is realized by the mixture of pollen, appears more

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TOVMASYAN, O.V.

Frost resistance of corn of various origins during seed germination.
Trudy Inst. gen. no.31:163-175 '[illegible]. (MLRA 17:9)

TOVMASYAN, O.V.

Biological effect of foreign pollen on the self-pollination of corn. Agrobiologiia no.6:859-864 N-D '65.
(MIRA 18:12)

1. Institut genetiki AN SSSR.

GLUSHCHENKO, I.Ye.; TOVMASYAN, O.V.

Charles Darwin and some problems related to the fertilization of plants. Trudy Inst. gen. no. 27:234-245 '60.
(MIRA 13:12)

(Plant breeding)

TOVMASYAN, O.V.

Inheritance of the characters of two pollinator varieties in corn.
Agrobiologiia no.2:25-30 Mr-Ap '57. (MLRA 10:5)

1.Institut genetiki Akademii nauk SSSR.
(Corn breeding) (Fertilization of plants)

USSR / General Biology - Genetics. B

Abs Jour: Ref Zhur-Biol., No 9, 1958, 38067.

Author : Toymasyan, O. V.
Inst : Not given.
Title : Inheriting Features of Two Pollinator Varieties of Corn.

Orig Pub: Agrobiologiya, 1957, No 2, 25-30.

Abstract: Variety Sterling, belonging to the group of white toothlike corn, was pollinated with a pollen mixture of varieties with a markedly different grain coloring-Rumynskaya yellow, Minnesota 13, Vengerskaya black, and Sakharnaya black. Along with the colored F_1 grains on the same cobs a small quantity of white grains developed. The author denies the possibility of their parthenogenetic generation, since in checking the descendants of

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USSR / General Biology - Genetics. B

Abs Jour: Ref Zhur-Biol., No 9, 1958, 38067.

Abstract: the white grains obtained by pollination with pollen of yellow and black corn, these were generally found to be hybrid. It is concluded that grains of the maternal type are formed as a result of fertilization of two paternal forms by the pollen.

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GLOUSHCHENKO, I.E. and TOVMASYAN, O.V.

"The Mentoring Action of the Foreign Pollen in Self-pollinating Corn Lines."
Paper submitted for the Intl. Botanical Congress, Montreal, Canada, 19-29 Aug 1969.

Institute of Genetics, Academy of Sciences U.S.S.R., Moscow.

TOVMASYAN, O.V.

Inheritance of the characters of two pollinators in corn. Trudy Inst. gen. no.24:156-163 '58. (MIRA 11:9)
(Corn breeding)

TOVMASYAN, O.V.

Comparative study of the growth and development of self-pollinated and additionally pollinated lines of corn. Trudy Inst. gen. no.30:187-194 '63. (MIRA 16:1)

GLUSHCHENKO, I.Ye.; TOVMASYAN, O.V.

Principles and first results in corn breeding at the Institute of Genetics of the Academy of Sciences of the U.S.S.R. Trudy Inst.gen. no.23:47-59 '56. (MLRA 10:1)
(Corn breeding)

TOVMASYAN, O.V.

Effect of different pollination methods on the tality of corn. (MLRA 10:1)
Trudy Inst.gen.no.23:60-64 '56.
(Corn breeding) (Fertilization of plants)

TOVMASYAN, O.V.

Cold resistance of hybrid corn populations. Agrobiologiia no.2:298-301 Mr-Ap '61. (MIRA 14:3)

1. Institut genetiki Akademii nauk SSSR.
(Corn(Maize)) (Plants—Frost resistance)

TOVMASYAN, O.V.

Resistance of hybrid corn populations to lowered temperatures. (MIRA 14:11)
Trudy Inst gen. no.28:136-140 '61.
(CORN (MAIZE))
(PLANTS, EFFECT OF TEMPERATURE ON)

TOVMASYAN, O.V.

Cold resistance of germinating corn seeds. Agrobiologia 5:766-773 S-O '64. (MIRA 17:11)

1. Institut genetiki AN SSSR.

S/670/62/000/029/002/006
D291/D307

AUTHOR: Tovmasyan, O.V.

TITLE: The effect of single and repeated X-ray doses on the growth and development of maize

SOURCE: Akademiya nauk SSSR. Institut genetiki. Trudy. no. 29, 1962, 178-184

TEXT: Dry seeds of a midlate variety, Sterling zubovidnyj, and two early varieties, Belyaroye psheno and Rumynskaya zheltaya, were exposed to X-ray doses ranging from 1,000 to 24,000 r one month prior to sowing in 1957. The effects on different dosages on the growth and development of plants from the treated seeds and from untreated control seeds were recorded noting varietal differences in response. In Sterling and Rumynskaya zheltaya, the 1000-2000 r doses stimulated growth and reduced the length of the vegetative period. In Belyaroye psheno, the same doses increased percent germination and survival. Higher doses generally delayed growth, caused developmental anomalies and reduced grain set. It was noted that

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The effect of single ...

only Sterling survived the highest dose, while Rumynskaya zheltaya failed to survive doses of 14,000 r or more. Tests in 1958 on Sterling showed that the stimulating effect of a 2000 r dose was inherited by plants of the following generation. However, this dosage rate depressed growth when seeds of Sterling were exposed to it in two successive seasons and the adverse effects of the 4000 r rate were substantially increased when irradiation was similarly repeated. The 4000 r dose was shown to decrease in size and to increase the sterility of pollen grains of Sterling, the effects which were augmented with the double irradiation treatment. There are 4 figures and 6 tables.

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TOVMASYAN, O.V.

Effect of single and repeated X-ray irradiation on the growth and development of corn. Trudy Inst. gen. no.29:178-184 '62. (MIRA 16:7)

(Plants, Effect of X-rays on)
(Corn(Maize))

S/081/62/000/024/064/073
B166/B186

AUTHORS: Gevorkyan, Kh. O., Tovmasyan, P. A.

TITLE: Study of tuff - clay ceramic masses

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 24, 1962, 573, abstract 24K245 (Sb. nauchn. tr. Yerevansk. politekhn. in-t. Yerevan, 1960, 223 - 236)

TEXT: Three varieties of tuff (tuff lavas, volcanic tuffs and felsite tuffs) were studied with a view to making use of tuff fines (quarry waste) in ceramics. It was established that with respect to its fusibility and the results of testing the physical and mechanical properties of burned specimens tuff should be included in the group of fusible, non-ductile ceramic raw materials. Ceramic masses based on $\leq 50\%$ tuff and clay are sintered at 1050 - 1150°C. Firing at >1150°C causes deterioration of the physical and mechanical properties of articles and gives rise to swelling. The optimum physical and mechanical properties of the body are obtained with a 20 % tuff content in the ceramic mass. [Abstracter's note: Complete translation.]

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GEVORKYAN, Kh.O.; TOVMASYAN, P.A.

Use of Shorzha serpentite in ceramics. Izv.AN Arm.SSR. Khim.nauki 11 no.2:83-94 '58. (MIRA 11:11)

1. Yerevanskiy politekhnicheskiy institut imeni K.Marksa.
(Serpentites) (Ceramic materials)

USSR / Human and Animal Physiology (Normal and Pathological). T-1
General Problems.

Abs Jour : Ref Zhur - Biologiya, No 13, 1958, No. 59963

Author : Shchukuryan, K. G.; Tovmasyan, R. A.; Tarverdyan, A. N.
Inst : Republican Clinical Hospital of ArmSSR
Title : Several Data on the Effect of the Irritation of the Vestibular Analysor Upon the Secretory Function of the Stomach

Orig Pub : Sb. nauchn. tr. Resp. klinich. bol'nitsy ArmSSR, 1957, 1, 529-531

Abstract : After rotation in the Barany chair with a speed of 10 rev/20 sec., a parasympathetic effect appeared in 23 and 38 subjects (increase in the quantity of gastric secretion and the content of total, free and bound HCl), in 7 persons a sympathetic effect was observed (decrease in secretion and acidity), and in the remaining ones there was no reaction to the rotation. -- T. G. Beteleva

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TOVMASYAN, Suren Akopovich

[Report by Comrade N.S.Khrushchev at the 21st Congress of the CPSU entitled "Control figures in the development of the national economy of the U.S.S.R., 1959-1965" and tasks of the Communist Party of Armenia] Tezisy doklada tovarishcha N.S.Khrushcheva na XXI s"ezde KPSS "Kontrol'nye tsifry razvitiia narodnogo khoziaistva SSSR na 1959-1965 gody" i zadachi Kommunisticheskoi partii Armenii; doklad na vneocherednom XX s"ezde Kommunisticheskoi partii Armenii 10 ianvaria 1959 goda. Erevan, Armianskoe gos. izd-vo, 1959. 72 p.
(MIRA 14:9)

(Armenia--Economic policy)

STEPANYAN, G.G.; TOVMASYAN, S.A.; [illegible]

Mechanism of the action of natural gastric juice on the animal organism. Izv. AN Arm. SSR. Biol. nauki 17 no.[illegible] 23-27 [illegible] '64. (MIRA 17:10)

1. Kafedra fiziologii Yerevanskogo zooveterinarnogo instituta.

TOVMASYAN, S.S.

Automation and the problem of the professional division of labor. Izv.AN Arm.SSR.Obshchestv.nauki no.3:35-46 Mr '60. (MIRA 13:7)
(Automation) (Division of labor)

[illegible], [illegible]

[illegible], [illegible] --"Cultivable [illegible] with [illegible] barley in the [illegible] Region of the Armenian SSR." *(Dissertation for Degree in Science and Engineering Defended at USSR Higher Educational Institutions, [illegible] Higher Education, USSR, Yerevan State U imeni V. M. Molotov, Yerevan, 1955)

SO: Knizhnaya Letopis', No. 25, 18 Jun 55

* For Degree of Candidate in Biological Sciences

ZLOMANOV, Leonid Pavlovich, kand. ekonom. nauk; DUBROVSKIY, Yu.N., red.; TOVMOSYAN, M.Ye., red.; NAZAROVA, A.S., tekhn. red.

[Economic relations between city and village during the large-scale building of communism] Ekonomicheskie sviazi goroda i derevni v period razvernutogo stroitel'stva kommunizma. Moskva, Izd-vo "Znanie," 1962. 44 p. (Novoe v zhizni, nauki, tekhnike. III Seriia: Ekonomika, no.1) (MIRA 15:4)
(Agricultural policy)

ALEKSANDROVSKIY, A.; RUSSKIY, A.; TOVMOSYAN, M.Ye., red.; RAKITIN, I.T., tekhn. red.

[Bourgeois economics at the present-day stage] Burzhuaznaia politicheskaia ekonomiia na sovremennom etape. Moskva, Izd-vo "Znanie," 1962. 47 p. (Novoe v zhizni, nauke, tekhnike. III Seriia; Ekonomika, no.2) (MIRA 15:4)

(Economics)

VOINOV, Arkadiy Mikhaylovich, kand. ekonom. nauk; TARNOVSKIY, Oleg Ivanovich, kand. ekonom. nauk; TOVMOSYAN, M.Ye., red.; RAKITIN, I.T., tekhn. red.

[Toward a common aim with a united front; on the economic cooperation of socialist countries] Edinym frontom k edinoi tseli; ob ekonomicheskom sotrudnichestve sotsialisticheskikh stran. Moskva, Izd-vo "Znanie," 1961. 46 p. (Vsesoiuznoe obshchestvo po rasprostraneniiu politicheskikh i nauchnykh znanii. Ser.3, no.23/24) (MIRA 15:2)
(Communist countries—Foreign economic relations)

MANEVICH, Yefim L'vovich, doktor ekonom. nauk, prof.; TOVMOSYAN, M.Ye., red.; NAZAROVA, A.S., tekhn. red.

[Mental and physical work] Trud umstvennyi i trud fizicheskii v period razvernutogo stroitel'stva kommunizma. Moskva, Izd-vo "Znanie," 1961. 47 p. (Vsesoiuznoe obshchestvo po rasprostraneniiu politicheskikh i nauchnykh znanii. Ser.3, Ekonomika, no.19) (MIRA 14:11)

(Work)

AGABABYAN, Sh.M., doktor sel'skokhozyaystvennykh nauk; TOVMASYAN, V.S.

Obtaining two crops of hay from mountain meadows. Trudy Arm. nauch.-issl. inst.zhiv. i vet. 4:169-177 '60. (MIRA 15:5)
(Armenia--Pastures and meadows)

26682 Transpal'pebral'naya ekstraktsiya katarakty. Oftalmol zurnal, 1949, No. 3 s. 132-38

SO: LETOPIS' NO. 35, 1949

SZALANTAY, Laszlo, Dr.; TOVOLGYI, Bela, Dr.

Articular osteochondromatosis. Orv. hetil. 99 no.10:356-357 9 Mar 58.

1. A Fejermegyei Tanacs Korhaz-Rendelointezet (vezeto-foorvos: Barath Istvan dr.) I. sz. Sebeszeti szakrendelesenek (szakfoorvos: Szalantay Laszlo dr.) es III. sz. szakrendelesenek (szakrendeles-vezeto: Tovolgyi Bela dr.) kozlemenye.

(OSTEOMA, case reports
osteochondromatosis of articular capsules of elbow & shoulder joints (Hun))
(ELBOW, dis.
osteochondromatosis of articular capsules of elbow & shoulder joints, case report (Hun))
(SHOULDER, dis.
same)

TOVORNIKOVA, D.; TRPIS, M.

Faunistic, ecologic, and zoogeographic remarks on mosquitos in Slovenia, Yugoslovia. In German. p. 721

BIOLOGIA. (Slovenska akademia vied) Bratislava, Czechoslovakia, Vol. 13, no. 10, 1958

Monthly List of East European Accessions (EEAI), LC, Vol. 8, no. 11, Nov. 1959
Uncl.

BRELIH, Savo; TOVORNIK, Daniça

Mallophaga of Yugoslavia. Pt.2. Biol vest no.10:85-100 '62.

1. Prirodoslovni muzej v Ljubljani i Zavod LRS za zdravstveno varstvo.

BRELIH, Savo; TOVORNIK, Danica

Bird lice (Malophaga) of Yugoslavia. Pt.3. Biol vest 11: 97-106'63.

1. Prirodoslovni muzej v Ljubljani, Zavod SRS za zdravstveno varstvo.

BRELIH, Savo; TOVORNIK, Danica

Contribution to the knowledge of the bird lice (Mallophaga) of Yugoslavia.I. Biol vest 9:93-107 '61.

1. Prirodoslovni muzej v Ljubljani. Zavod Ljudske republike Slovenije za zdravstveno varstvo.

[illegible]; [illegible]; [illegible], [illegible]; [illegible]
[illegible]; [illegible]; J[illegible], F.; TOVORNIK, D.; [illegible], B.

Epidemiological, clinical and laborator data on tick-borne meningoencephalitis in Slovenia in 1960-1963. Zdrav. vestn. 33 no.10:[illegible]-[illegible]3 '64.

[illegible], virusni laboratorij, Ljubljana ([illegible]: doc. dr. Sasa Cvahte); Infekcijska klinika medicinske fakultete v Ljubljani (Predstojnik: prof. dr. [illegible]).

TOVORNIK, Danica; BRELIH, Save

Biologic studies in the endemic areas of tick-borne encephalitis in Slovenia up to 1963. Biol inst 12:119-120 '64.

Mallophaga of Yugoslavia. Pt. 4. Ibid.:121-127

1. Virus laboratory of the Institute of Health Protection of Slovenia, Ljubljana (for Tovornik). 2. Museum of Natural Sciences of Slovenia, Ljubljana (for Brelih). Submitted July 31, 1964.

TOVORNIK, Danica
SURNAME (in caps); Given Names

Country: Yugoslavia

Academic Degrees: not given

Affiliation: not given

Source: Ljubljana, Zdravstveni vestnik, No 3-4, 1961, pp 93-95.

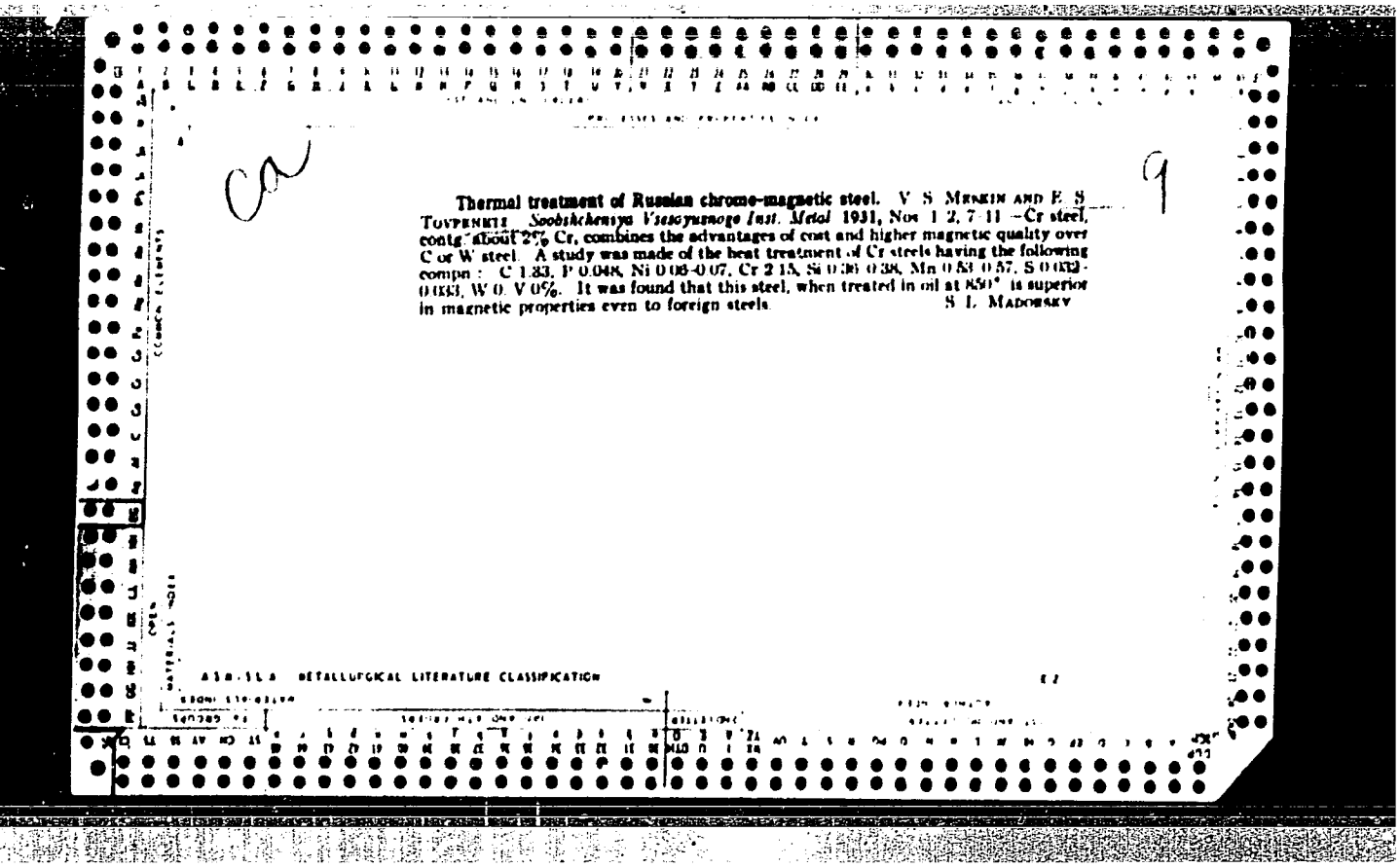
Data: "Course on Natural Focuses of Infections." (USSR Aug. 15-Sept. 18, 1960.)

TOVPENETS, V.Ye., inzh.

Shortcomings of K.V. Ruppeneit's book ("Rock pressure and displacement in flat coal seam longwalls". Ugol' 34 no.11:45-46 N '59 (MIRA 13:3)
(Subsidences(Earth movements))

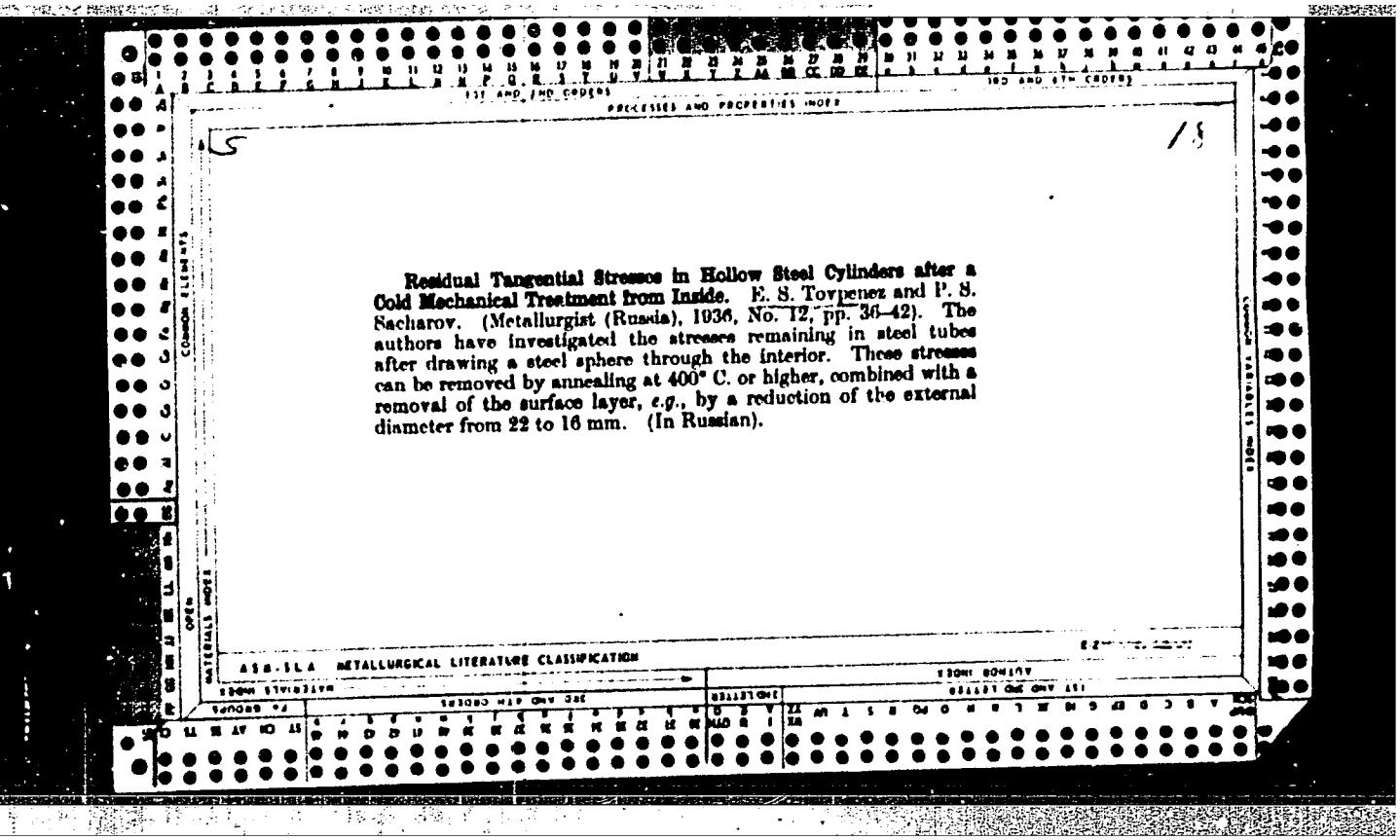
HALASHOVA, N.N.; SMAGUNOVA, N.A.; TOVPINETS, Ye.I.

Reducing the porosity of nickel coatings. Priborostroenie no. 2:12-13 F '64. (MIRA 17:3)

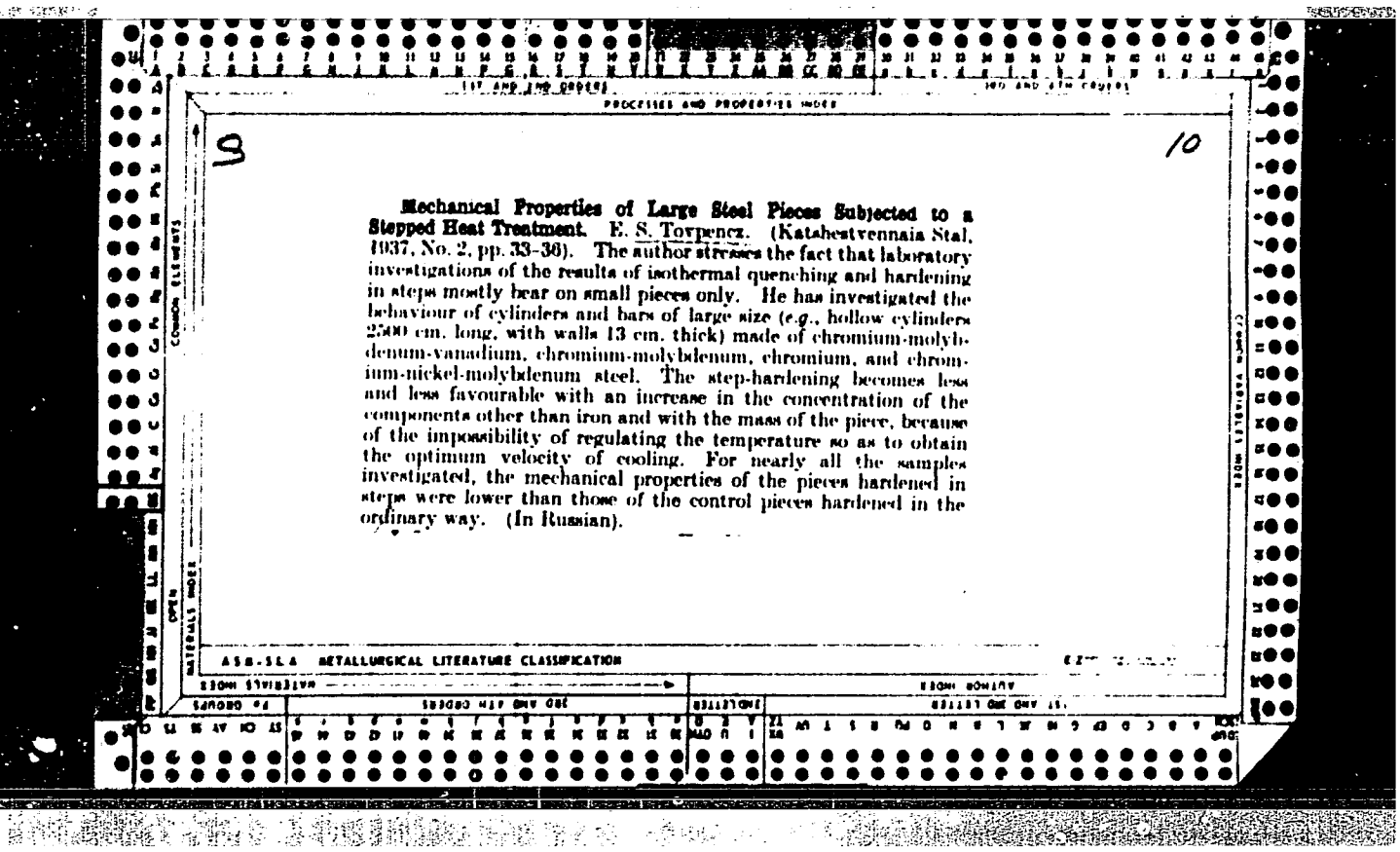


Thermal treatment of Russian chrome-magnetic steel. V. S. Merkin and E. S. Tolpekin. *Soobshcheniya Vsesoyuznogo Inst. Metal* 1931, Nos. 1-2, 7-11.—Cr steel, contg. about 2% Cr, combines the advantages of cost and higher magnetic quality over C or W steel. A study was made of the heat treatment of Cr steels having the following compn.: C 1.83, P 0.048, Ni 0.06-0.07, Cr 2.15, Si 0.36-0.38, Mn 0.53-0.57, S 0.032-0.033, W 0, V 0%. It was found that this steel, when treated in oil at 850° is superior in magnetic properties even to foreign steels. S. L. Madorsky

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



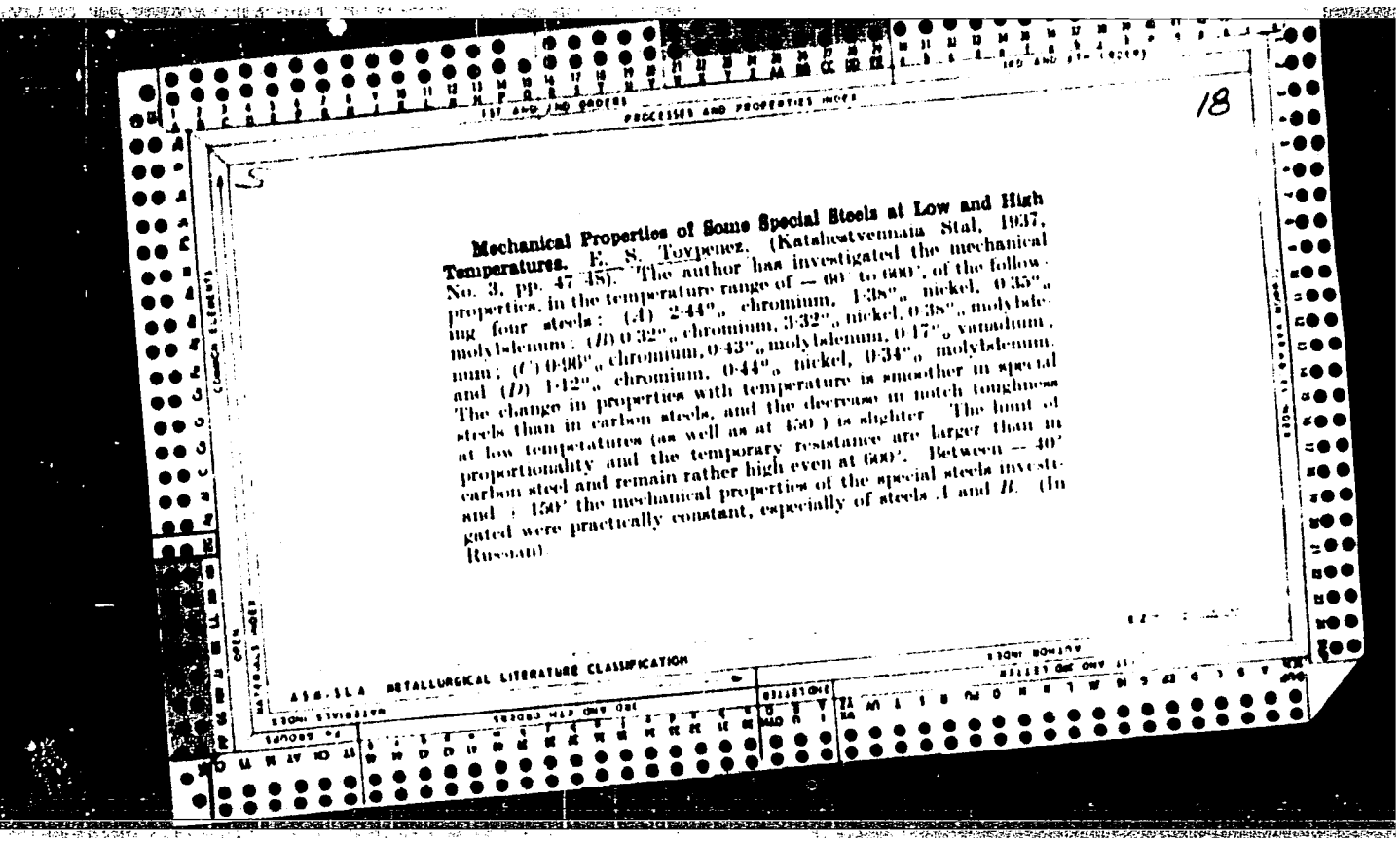
Residual Tangential Stresses in Hollow Steel Cylinders after a Cold Mechanical Treatment from Inside. E. S. Tovpenez and P. S. Sacharov. (Metallurgist (Russia), 1936, No. 12, pp. 36–42). The authors have investigated the stresses remaining in steel tubes after drawing a steel sphere through the interior. These stresses can be removed by annealing at 400° C. or higher, combined with a removal of the surface layer, *e.g.*, by a reduction of the external diameter from 22 to 16 mm. (In Russian).



9

10

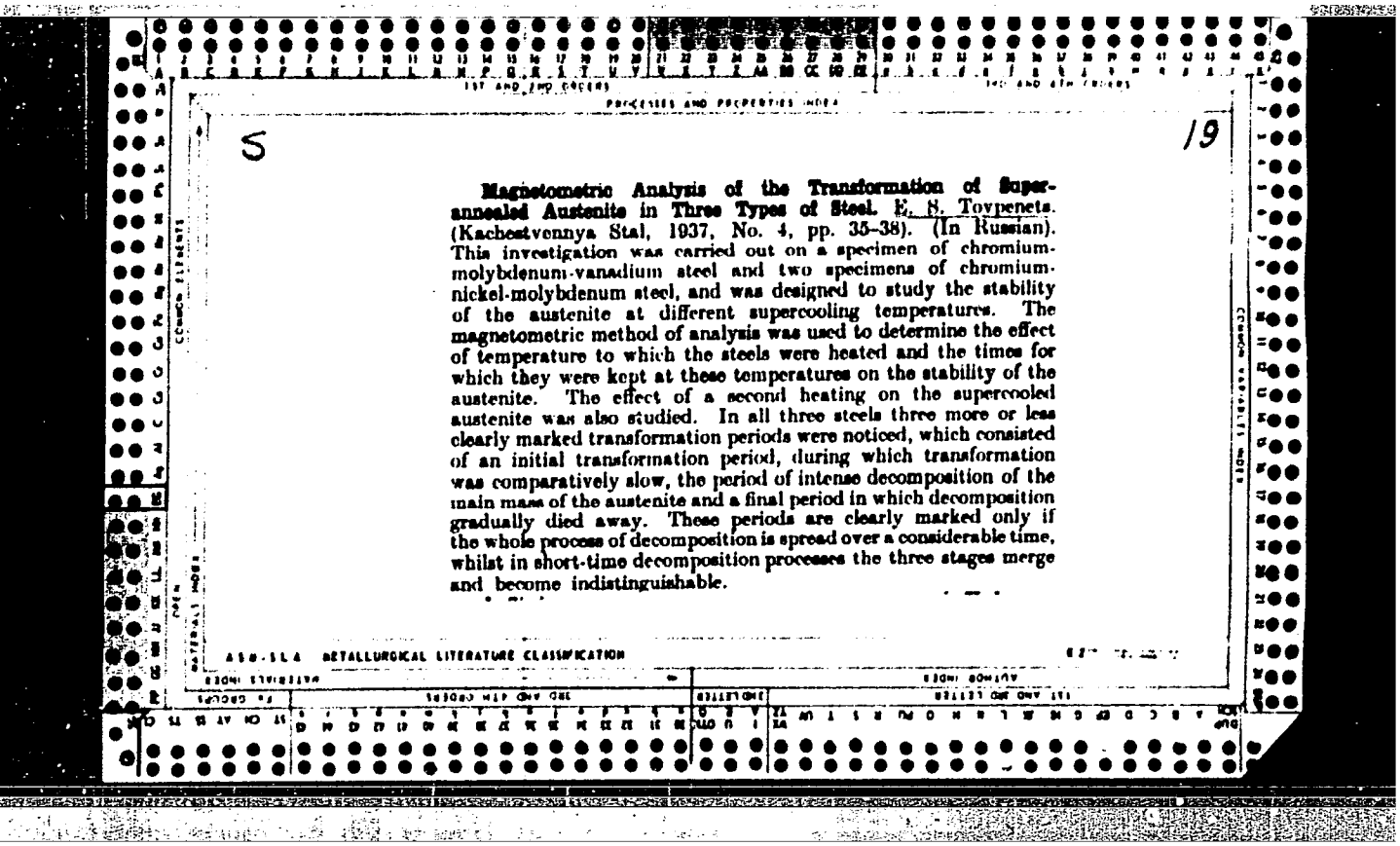
Mechanical Properties of Large Steel Pieces Subjected to a Stepped Heat Treatment. E. S. Torpenez. (Katsbestvennaia Stal, 1937, No. 2, pp. 33-36). The author stresses the fact that laboratory investigations of the results of isothermal quenching and hardening in steps mostly bear on small pieces only. He has investigated the behaviour of cylinders and bars of large size (e.g., hollow cylinders 2500 cm. long, with walls 13 cm. thick) made of chromium-molybdenum-vanadium, chromium-molybdenum, chromium, and chromium-nickel-molybdenum steel. The step-hardening becomes less and less favourable with an increase in the concentration of the components other than iron and with the mass of the piece, because of the impossibility of regulating the temperature so as to obtain the optimum velocity of cooling. For nearly all the samples investigated, the mechanical properties of the pieces hardened in steps were lower than those of the control pieces hardened in the ordinary way. (In Russian).



18

Mechanical Properties of Some Special Steels at Low and High Temperatures. E. S. Tovpenez. (Katasheatvennaia Stal, 1937, No. 3, pp. 47–48).—The author has investigated the mechanical properties, in the temperature range of — 60° to 600°, of the following four steels: (*A*) 2·44% chromium, 1·38% nickel, 0·35% molybdenum; (*B*) 0·32% chromium, 3·32% nickel, 0·38% molybdenum; (*C*) 0·90% chromium, 0·43% molybdenum, 0·17% vanadium; and (*D*) 1·12% chromium, 0·44% nickel, 0·34% molybdenum. The change in properties with temperature is smoother in special steels than in carbon steels, and the decrease in notch toughness at low temperatures (as well as at 150°) is slighter. The limit of proportionality and the temporary resistance are larger than in carbon steel and remain rather high even at 600°. Between — 40° and + 150° the mechanical properties of the special steels investigated were practically constant, especially of steels *A* and *B*. (In Russian)

A 38-SLA METALLURGICAL LITERATURE CLASSIFICATION

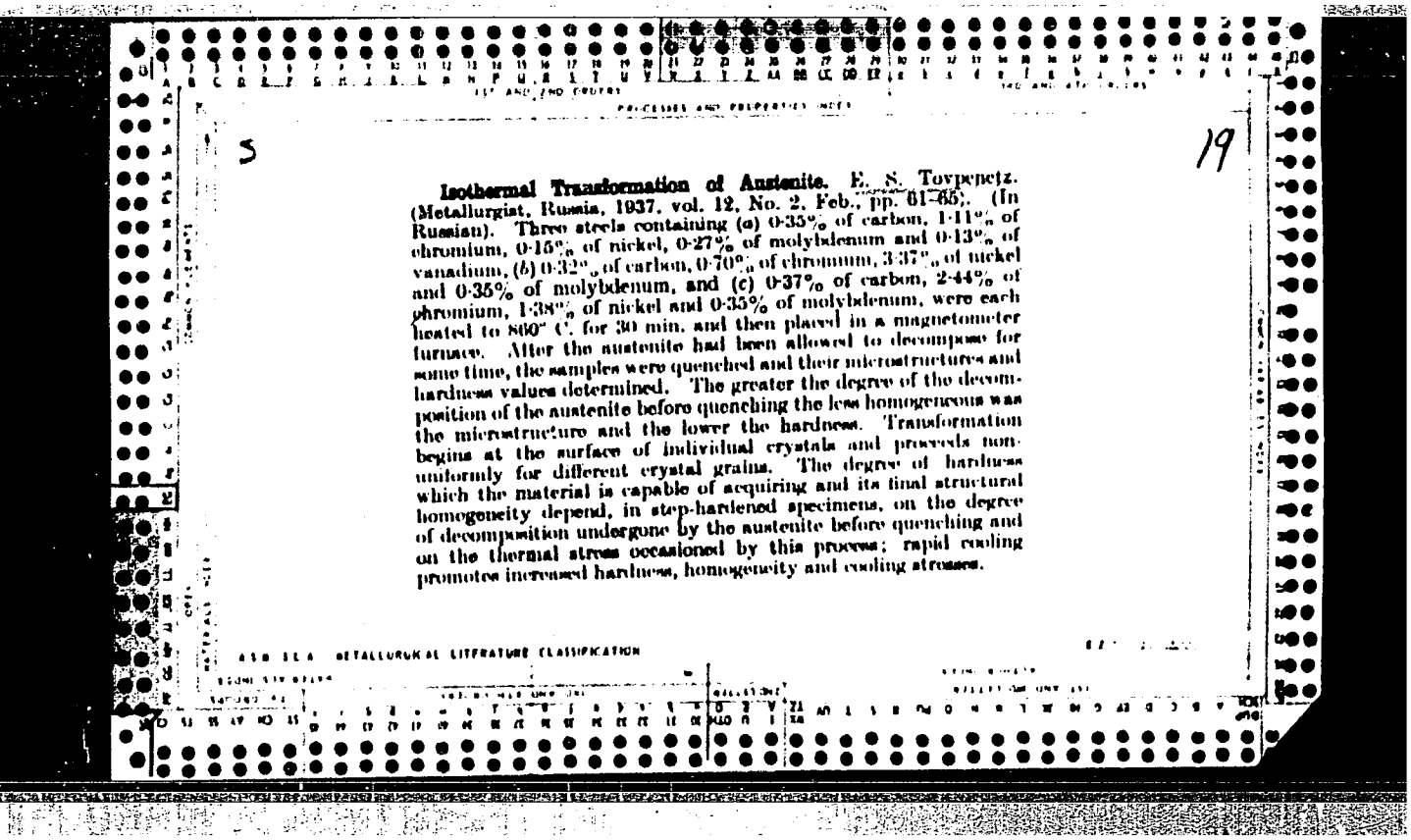


S

19

Magnetometric Analysis of the Transformation of Supercooled Austenite in Three Types of Steel. E. S. Tovpenets. (Kachestvennya Stal, 1937, No. 4, pp. 35–38). (In Russian). This investigation was carried out on a specimen of chromium-molybdenum-vanadium steel and two specimens of chromium-nickel-molybdenum steel, and was designed to study the stability of the austenite at different supercooling temperatures. The magnetometric method of analysis was used to determine the effect of temperature to which the steels were heated and the times for which they were kept at these temperatures on the stability of the austenite. The effect of a second heating on the supercooled austenite was also studied. In all three steels three more or less clearly marked transformation periods were noticed, which consisted of an initial transformation period, during which transformation was comparatively slow, the period of intense decomposition of the main mass of the austenite and a final period in which decomposition gradually died away. These periods are clearly marked only if the whole process of decomposition is spread over a considerable time, whilst in short-time decomposition processes the three stages merge and become indistinguishable.

A 58-5 LA METALLURGICAL LITERATURE CLASSIFICATION

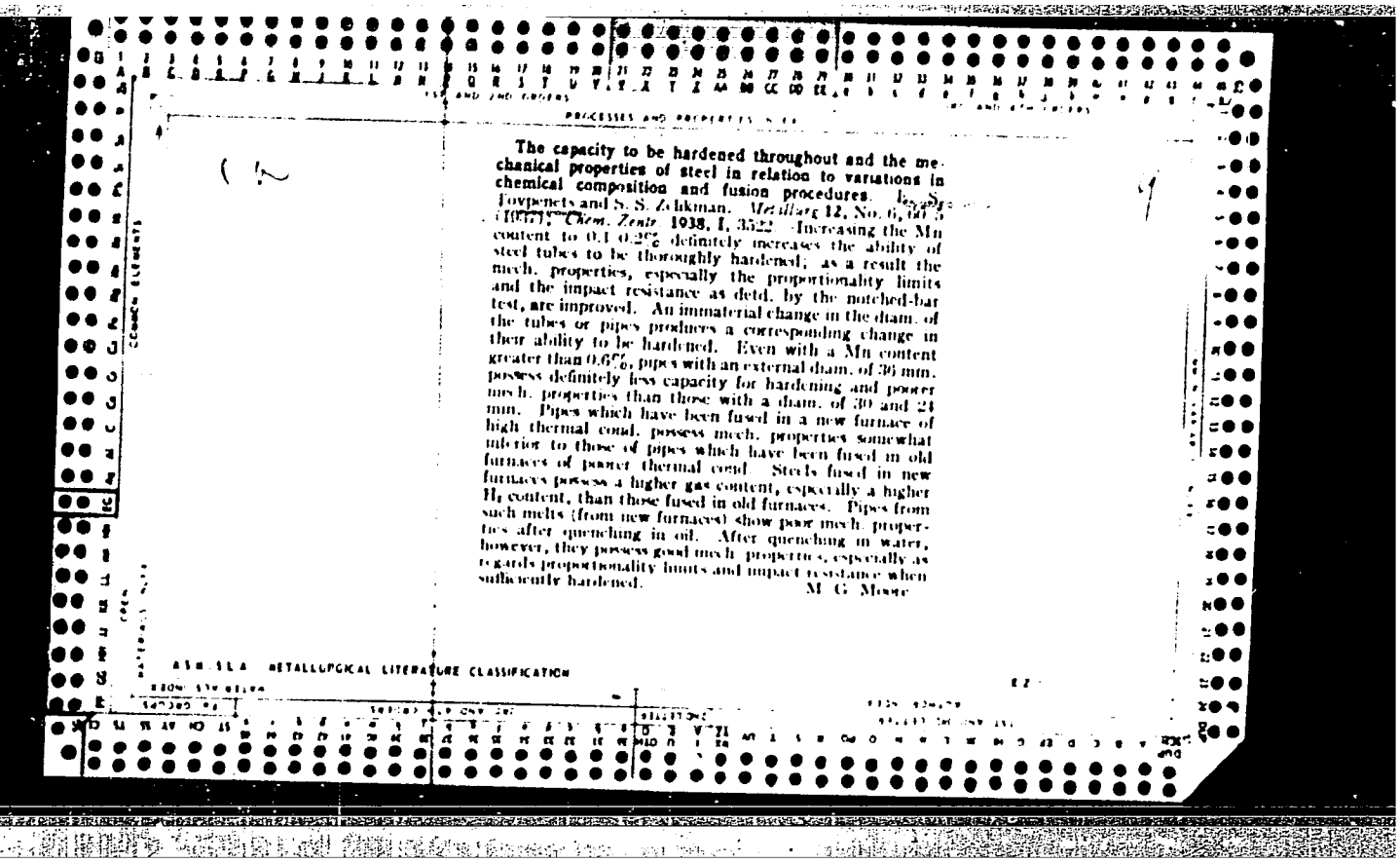


S

19

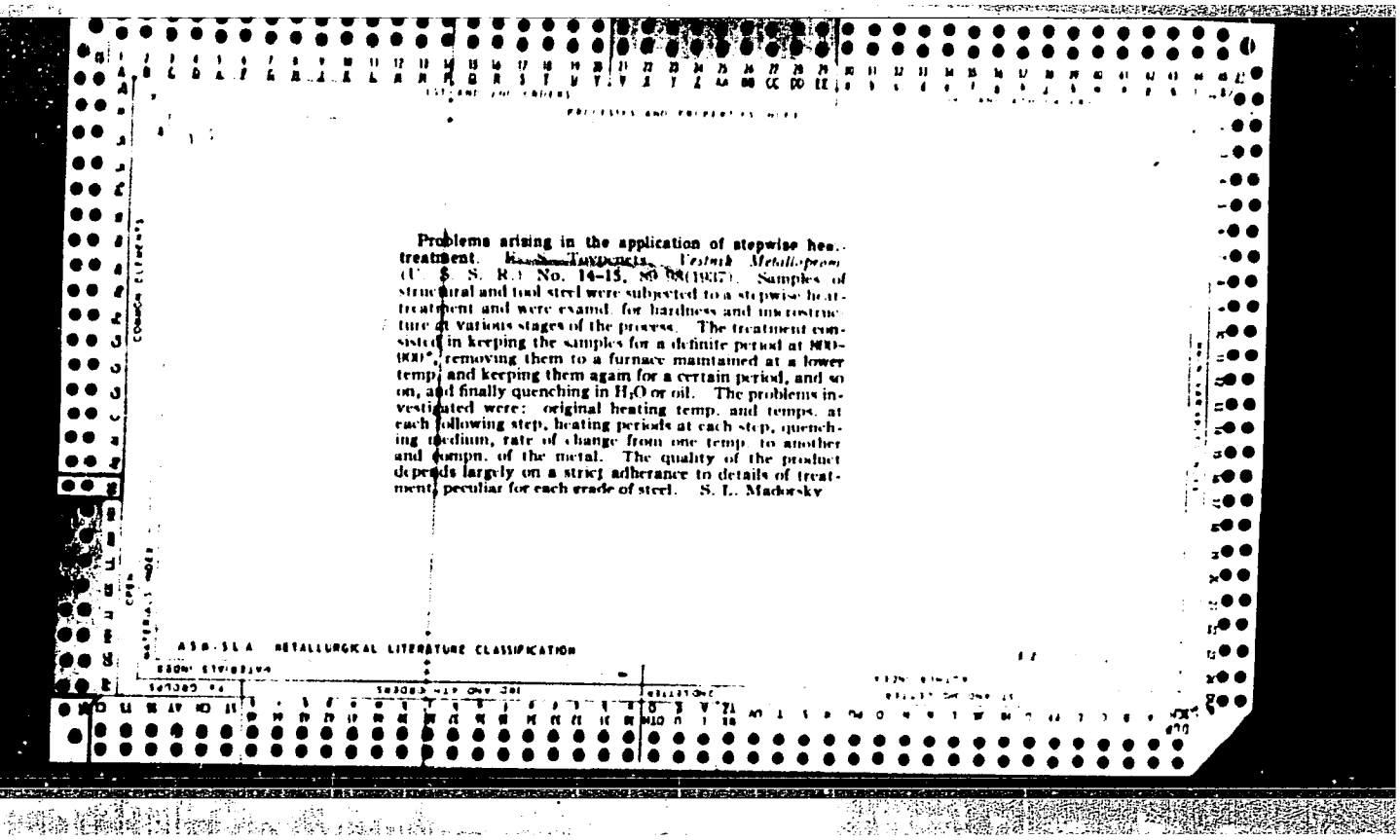
Isothermal Transformation of Austenite. E. S. Tovpenetz. (Metallurgist, Russia, 1937, vol. 12, No. 2, Feb., pp. 61–65). (In Russian). Three steels containing (*a*) 0·35% of carbon, 1·11% of chromium, 0·15% of nickel, 0·27% of molybdenum and 0·13% of vanadium, (*b*) 0·32% of carbon, 0·70% of chromium, 3·37% of nickel and 0·35% of molybdenum, and (*c*) 0·37% of carbon, 2·44% of chromium, 1·38% of nickel and 0·35% of molybdenum, were each heated to 800° C. for 30 min. and then placed in a magnetometer furnace. After the austenite had been allowed to decompose for some time, the samples were quenched and their microstructures and hardness values determined. The greater the degree of the decomposition of the austenite before quenching the less homogeneous was the microstructure and the lower the hardness. Transformation begins at the surface of individual crystals and proceeds non-uniformly for different crystal grains. The degree of hardness which the material is capable of acquiring and its final structural homogeneity depend, in step-hardened specimens, on the degree of decomposition undergone by the austenite before quenching and on the thermal stress occasioned by this process; rapid cooling promotes increased hardness, homogeneity and cooling stresses.

A S M E A METALLURGICAL LITERATURE CLASSIFICATION



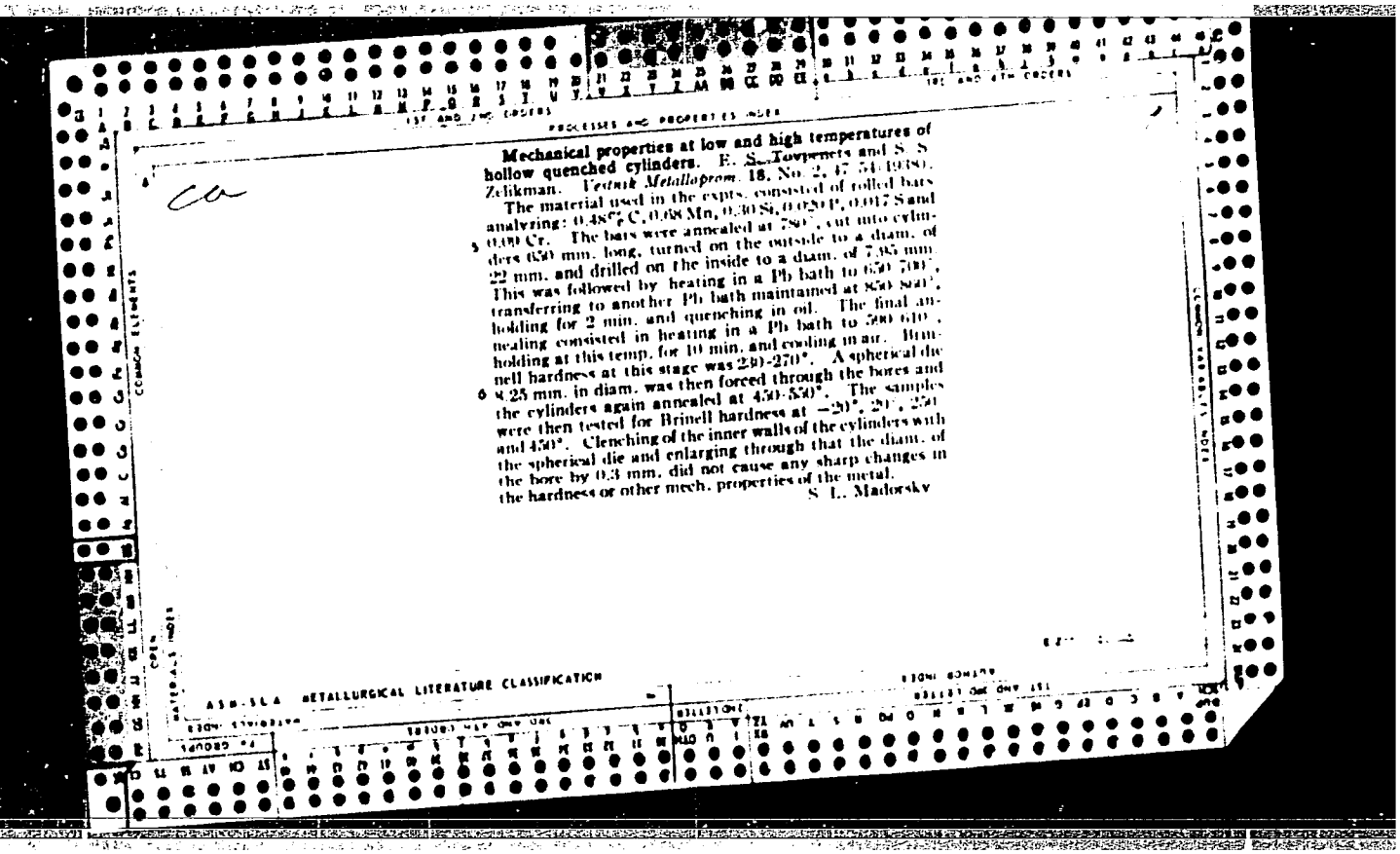
The capacity to be hardened throughout and the mechanical properties of steel in relation to variations in chemical composition and fusion procedures. I. S. Tovpenets and S. S. Zilkman. *Metallurg* 12, No. 6, 60–5 (1937); *Chem. Zentr.* 1938, I, 3522. Increasing the Mn content to 0.1–0.3% definitely increases the ability of steel tubes to be thoroughly hardened; as a result the mech. properties, especially the proportionality limits and the impact resistance as detd. by the notched-bar test, are improved. An immaterial change in the diam. of the tubes or pipes produces a corresponding change in their ability to be hardened. Even with a Mn content greater than 0.6%, pipes with an external diam. of 36 mm. possess definitely less capacity for hardening and poorer mech. properties than those with a diam. of 30 and 24 mm. Pipes which have been fused in a new furnace of high thermal cond. possess mech. properties somewhat inferior to those of pipes which have been fused in old furnaces of poorer thermal cond. Steels fused in new furnaces possess a higher gas content, especially a higher H_2 content, than those fused in old furnaces. Pipes from such melts (from new furnaces) show poor mech. properties after quenching in oil. After quenching in water, however, they possess good mech. properties, especially as regards proportionality limits and impact resistance when sufficiently hardened.

M. G. Moore



Problems arising in the application of stepwise hea.. treatment. [redacted] *Vestnik Metallopromy* (U. S. S. R.) No. 14-15, 89-98(1937). Samples of structural and tool steel were subjected to a stepwise heat-treatment and were examd. for hardness and microstructure at various stages of the process. The treatment consisted in keeping the samples for a definite period at 800-900°, removing them to a furnace maintained at a lower temp. and keeping them again for a certain period, and so on, and finally quenching in H_2O or oil. The problems investigated were: original heating temp. and temps. at each following step, heating periods at each step, quenching medium, rate of change from one temp. to another and compn. of the metal. The quality of the product depends largely on a strict adherance to details of treatment, peculiar for each grade of steel. S. L. Madorsky

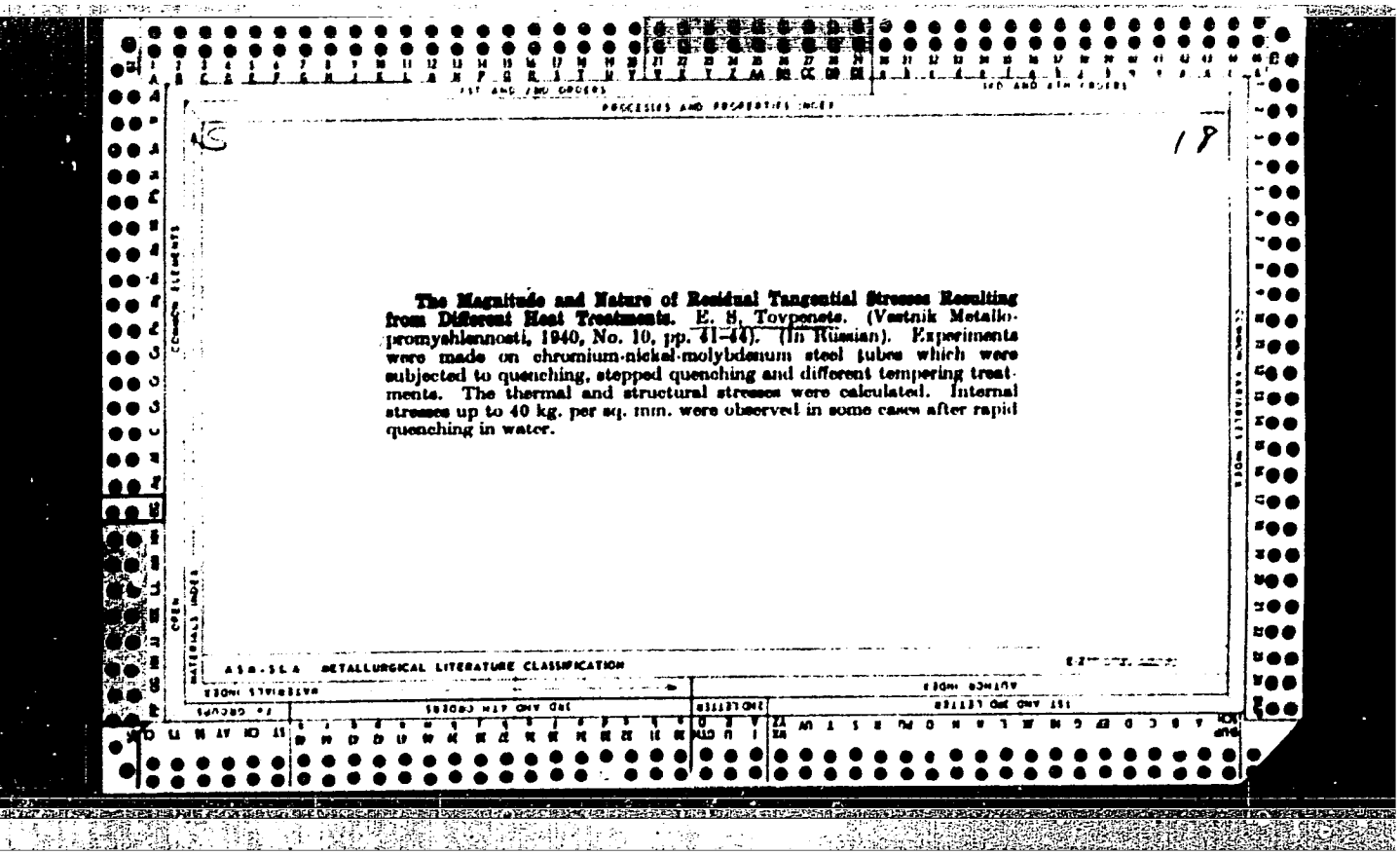
A 5 8 - 5 L A METALLURGICAL LITERATURE CLASSIFICATION



Mechanical properties at low and high temperatures of hollow quenched cylinders. E. S. Tovpenets and S. S. Zelikman. *Vestnik Metalloprom.* 18, No. 2, 47-54 (1938).

The material used in the expts. consisted of rolled bars analyzing: 0.48% C, 0.68 Mn, 0.30 Si, 0.020 P, 0.017 S and 0.09 Cr. The bars were annealed at 780°, cut into cylinders 650 mm. long, turned on the outside to a diam. of 22 mm. and drilled on the inside to a diam. of 7.85 mm. This was followed by heating in a Pb bath to 650-700°, transferring to another Pb bath maintained at 850-870°, holding for 2 min. and quenching in oil. The final annealing consisted in heating in a Pb bath to 580-610°, holding at this temp. for 10 min. and cooling in air. Brinell hardness at this stage was 230-270°. A spherical die 8.25 mm. in diam. was then forced through the bores and the cylinders again annealed at 450-550°. The samples were then tested for Brinell hardness at −20°, 20°, 250° and 450°. Clenching of the inner walls of the cylinders with the spherical die and enlarging through that the diam. of the bore by 0.3 mm. did not cause any sharp changes in the hardness or other mech. properties of the metal.

S. L. Madorsky



The Magnitude and Nature of Residual Tangential Stresses Resulting from Different Heat Treatments. E. S. Tovpenets. (Vestnik Metallopromyshlennosti, 1940, No. 10, pp. 41–44). (In Russian). Experiments were made on chromium-nickel-molybdenum steel tubes which were subjected to quenching, stepped quenching and different tempering treatments. The thermal and structural stresses were calculated. Internal stresses up to 40 kg. per sq. mm. were observed in some cases after rapid quenching in water.

TOVPENETS, Ye.S., kandidat tekhnicheskikh nauk; PISKUN, V.I., inzhener; SHLEPCHENKO, L.B., inzhener; GULYACHENKO, P.P., inzhener; LEONOV, L.I., inzhener; POTAPOV, I.F., inzhener.

Improving the quality of the cutting teeth of cutting machines and of combined mining machines. Ugol' 29 no.10:23-26 O '54.(MLRA 7:11)

1. Donetskiy industrial'nyy institut (for Tovpenets & Piskun) 2. Krasnoluchskiy mashinostroitel'nyy zavod (for Shlepchenko, Gulyachenko & Leonov) 3. Kombinat Stalinugol' (for Potapov)
(Coal--Mining machinery)

TOVPENETS, Ye.S., kandidat tekhnicheskikh nauk.

Study of isothermic annealing of certain alloyed steels. Metalloved. i obr. met. no.2:53-56 F '56. (MLRA 9:7)

1.Donetskiy industrial'nyy institut imeni N.S.Khrushcheva.
(Steel alloys--Heat treatment)

133-7-20/28

AUTHOR: Tovpenets, Ye.S., Candidate of Technical Sciences.

TITLE: The Influence of Heat-treatment Practice on the Stability of Super-cooled Austenite. (Vliyaniye rezhima termicheskoy obrabotki na ustoychivost' pereokhlazhdennogo austenita)

PERIODICAL: Stal', 1957, No.7, pp. 642 - 643 (USSR)

ABSTRACT: The influence of heat-treatment practice (temperature, soaking time, velocity of cooling) on the stability of super-cooled austenite, on the kinetics of its transformation and on the nature of the products obtained was studied. Chemical composition of steels investigated 40XH, 40XHM, 35XHM, 18XHBA and ШХ15 is given in Table 1. Heat-treatment conditions and experimental results are given in Table 2 and Figs. 1 and 2. There are 2 tables, 2 figures and 3 Slavic references.

ASSOCIATION: Donets Industrial Institute (Donetskiy Industrial'nyy Institut)

AVAILABLE: Library of Congress.

Card 1/1

TOVPENETS, YE. S.

Tovpenets, Ye. S. and Piskun, V. T. "The mechanical properties of U7A, 9XZ, 7XZ, 65G and 6XS (EI 325) steels," Trudy Stalinskogo obl. otd-niya VNITOM, No. 1, 1949, p. 104-06

SO: U-5241, 17 December 1953, (Letopis 'Zhurnal 'nykh Statey, No. 2[illegible], 1949)

"OTPENET, Ye.".

Effect of quenching conditions during the hardening of rod reinforcements in the rolling process on the mechanical properties of these reinforcements. Izv.vys.uchseb.zav.; chern.met. 8 no.8:123-129 '65. (MIRA 18:8)

1. Donetskiy politekhnicheskiy institut.

TOVPENETS, Ye.S., kand. tekhn. nauk; IVASHCHENKO, V.M., inzh.; STYCHINSKIY, L.P., inzh.; ZHUKOV, A.I., inzh.; MERSHCHIY, N.P., inzh.; KORENEV, K.I., inzh.; SHUMEYKO, R.I., inzh.; IVANOV, F.I., inzh.

Mechanical properties of reinforcement rods after heat treatment from the rolling process temperature. Stal' 25 no.2:157-160 F '65. (MIRA 18:3)

1. Donetskiy politekhnicheskiy institut; Makeyevskiy metallurgicheskiy zavod; Nauchno-issledovatel'skiy institut "Donpromstroy" i Novo-Kramatorskiy zavod tyazhelogo mashinostroyeniya.

TOVPENETS, Ye.S.

Effect of thermal treatment conditions on the mechanical properties of reinforcement rods. Metalloved. i term.obr.met. no.1:30-32 Ja '65. (MIRA 18:3)

1. Donetskiy politekhnicheskiy institut.

TOVPENETS, Yemel'yan Semenovich; RAYTBURD, L.L., red.; STARODUB, T.A., tekhn. red.

[Heat treatment of rolled products and forgings]Termicheskaia obrabotka prokata i pokovok. Kiev, Gostekhizdat USSR, 1962. 155 p. (MIRA 15:12)

(Rolling (Metalwork)) (Steel forgings—Heat treatment)

TOVPENETS, Ye.S., kand.tekhn.nauk; IVANOV, F.I., inzh.; GONTAR', M.A., inzh.

Effect of quenching conditions during the reduction [sic] of steel on the amount of residual austenite. Metalloved. i term. obr. met. no.5:8-12 My '62. (MIRA 15:5)

1. Donetskiy politekhnicheskiy institut.
(Steel--Quenching) (Annealing of metals)

37831
S/123/62/000/008/003/016
A004/A101

1.1710

AUTHOR: Tovpenets, Ye. S.

TITLE: The effect of the heat-treatment conditions of grade 35 steel blanks on their mechanical properties

PERIODICAL: Referativnyy zhurnal, Mashinostroyeniye, no. 8, 1962, 17, abstract 8A111 ("Tr. Donetsk. politekhn. in-ta", 1961, v. 56, 143-145)

TEXT: The author compared the mechanical properties (σ_b, σ_s, δ, a_k and HRC) of grade 35 steel heat-treated by rolling heating with the properties of specimens which were heat-treated at various conditions. The test results revealed that the optimum condition is quenching in hot water at 820°C with tempering at 670°C. In this case a_k is twice as high as that of rolled material. Hardening by rolling heating with high tempering improves the properties in the same degree as after a special heat treatment, with the exception of a_k.

[Abstracter's note: Complete translation]

X

Card 1/1

S/137/62/000/004/090/201
A052/A101

18.7500

AUTHOR: Tovpenets, Ye. S.

TITLE: Magnetometric analysis of supercooled austenite transformation at alloyed steel annealing

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 4, 1962, 15, abstract 4I94 ("Tr. Donetsk. industr. in-ta", no. 32, 1958, 45-58)

TEXT: The effect of annealing temperature and cooling conditions on the stability of supercooled austenite in 40ХН(40KhN) and 5ХНТ(5KhNT) steels was investigated by the magnetometric and microstructure methods and by measuring the microhardness. It is established that with the increase of the austenizing temperature the stability of austenite increases. The maximum austenite stability in the perlite region is observed at a step isothermic annealing. Under oscillating cooling conditions the effect of austenizing temperature weakens. The effect discovered is ascribed to the fact that under isothermic conditions, owing to a continuous presence of the metal in the high temperature region, favorable conditions are created for diffusion processes and for the separation

Card 1/2

S/137/62/000/004/090/201
A052/A101

Magnetometric analysis ...

of decomposition products of supercooled austenite. There are 12 references.

A. Fedorovskiy

[Abstracter's note: Complete translation]

Card 2/2

S/137/62/000/002/032/144
A006/A101

AUTHOR: Tovpenets, Ye. S.

TITLE: Changes in the linear dimensions of cylindrical specimens depending on heat treatment conditions

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 2, 1962, 6, abstract 2I44 ("Tr. Donetsk. industr. in-ta", 1958, 32, 73 - 87)

TEXT: The author investigated 15 different structural steel grades. It is shown that with higher heating temperature and degree of alloying the steel, the stability of supercooled austenite increases, and its full decomposition is not always completed after 3 hour tempering at 640 - 660°C with subsequent stepped cooling, but also during variation cooling according to scheme T_{aust} 250°C → → 650°C → 20°C. With a higher stability of supercooled austenite, the sensitivity of the steel to changes in dimensions increases as a result of heat treatment. When cooling steel with stable austenite, in the upper sub-adjacent temperature region, under stepped conditions with holding at 640 - 660°C, changes in the dimensions are much greater than in variation cooling.

[Abstracter's note: Complete translation] L. Vul'f

Card 1/1

S/137/61/000/011/093/123
A060/A101

AUTHOR: Tovpenets, Ye. S.

TITLE: Effect of the cooling conditions in annealing steels 60 ХГ, 9Х, 9 ХФ, 9ХМФ, and 9 ХСФ (60KhG, 9Kh, 9KhF, 9KhMF, and 9KhSF) upon their toughness

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 11, 1961, 12, abstract 11I66 ("Tr. Donetsk. industr. in-ta", 1958, 32, 59-72)

TEXT: The author investigated the effect of the heat-treatment conditions of the steel for hot and cold rolling rolls upon its toughness. It was established that steel grades 60KhG, 9Kh, 9KhF, 9KhMF, and 9KhSF possess a high sensitivity with respect to a_k change not only with changes in the heating temperature, but also with changes of the cooling conditions during annealing. As the heating temperature and the supercooling temperature are raised, the a_k is lowered. Tempering of the steel after annealing raises the a_k independent of the conditions of the latter. Steel 9Kh and 60KhG are distinguished by a notable tendency to tempering brittleness. The optimum annealing conditions

Card 1/2

S/137/61/000/011/093/123
A060/A101

Effect of the cooling conditions ...

after forging consist of heating up to 950°C soaking at that temperature, and fluctuating cooling with supercooling down to 200°C, heating up to 780 - 820°C, repeated supercooling to 200°C, and heating up to 650°C.

E. Fedorova

[Abstracter's note: Complete translation]

Card 2/2

TOVPENETS, Ye.S.; YUDOVICH, S.Z.

Formation of flakes in steel during the time of its inspection for flakes. Izv.vys.ucheb.zav.; chern.met. 4 no.6:134-138 '61. (MIRA 14:6)

1. Donetskiy industrial'nyy institut i Zaporozhskiy mashinostroitel'nyy institut.

(Steel ingots—Defects)

TOVPENETS, Ye.S.; PISKUN, V.T.; KATSENBERG, A.R.

Effect of the conditions of cooling on the mechanical properties of rolled bulb-angle strip made of 4S and SKhL-4 steels. Izv.vys. ucheb.zav.; chern.met. no.4:114-118 '61. (MIRA 14:4)

1. Donetskiy industrial'nyy institut i Stalinskiy metallurgicheskiy zavod.
(Rolling (Metalwork)) (Steel--Heat treatment)

S/148/61/000/006/011/013
E073/E435

AUTHORS: Tovpenets, Ye.S. and Yudovich, S.Z.

TITLE: On the formation of flakes in steel during the process of investigation of the steel for flakes

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Chernaya metallurgiya, 1961, No.6, pp.134-138

TEXT: Several authors pointed out that flakes may form in steel during the process of investigation for flakes and as a result of that perfectly good metal, which has a high sensitivity to the formation of flakes, may be scrapped. Therefore, present methods of testing steel for flakes have to be changed and for this purpose additional experiments are necessary. The here described experiments were carried out with the steels 18ХНВА (18KhNVA) and ШХ15 (ShKh15). Specimens were cut, after the termination of the rolling, from blanks of the following cross-sections: 152 x 152 mm, 150 x 150 mm, 125 x 125 mm and 150 mm dia., they were notched to half the cross-section in the hot state and air and water quenched to 20°C. Half of the specimens of each batch were fractured by means of a 1/2-ton hammer the second day after

Card 1/4

cooling and the most characteristic fractures were photographed. The specimens which had not fractured were notched with an acetylene flame and again fractured. Two to three days later the second half of the specimens was subjected to the following heat treatment: high temperature tempering at 700°C for 4 hours followed by slow cooling in the furnace to 400 - 600°C and then in air. The total duration of the tempering was 16 to 20 hours. The specimens which were previously tested under the hammer were subjected to the same tempering conditions so as to facilitate cutting of discs for flake investigations. 25 mm discs were cut from the middle part of the specimen and from the individual discs metallographic specimens were cut for determining the microstructure, hardness and microhardness. The results have shown that all the specimens from certain heats of both steels were highly insensitive to flake formation. Even after water quenching and fracturing under the hammer they showed cracks but not flakes. The cause of differing sensitivities to flake formation is attributed to differing hydrogen contents of the steel. Specimens of both steels from other heats had a higher

sensitivity to the conditions of cooling after rolling: for one steel, water quenched specimens showed large flakes and quenching cracks, whilst air quenched specimens only showed fine flakes and specimens which were tempered at 700°C after water quenching showed quenching cracks but no flakes. The specimens of the other steel from a specific heat showed flakes regardless of the heat treatment conditions. The following conclusions are arrived at:
1. Formation of flakes in steel under the influence of mechanical effects is only possible if it contains microvolumes of increased brittleness (martensite).
2. Mechanical effects during taking and treatment of the specimens increases the possibility of flake formation.
3. For steels that are sensitive to flake formation, the method of taking specimens for flake investigations has to be changed so as to reduce the mechanical effects on the metal.
4. If flakes detected in the specimens have not otherwise shown up, the metal should be additionally heat treated (high temperature tempering or annealing) so as to eliminate the foci of increased brittleness of the metal.

Card 3/4

On the formation of flakes ... S/148/61/000/006/011/013
E073/E435

B.I.Golubchik and M.A.Klyachkina participated in the experiments.
There are 3 figures and 5 Soviet references.

ASSOCIATIONS: Donetskiy industrial'nyy institut i
Zaporozhskiy mashinostroitel'nyy institut
(Donets Industrial Institute and
Zaporozhe Engineering Institute)

SUBMITTED: July 15, 1960

Card 4/4

TOVPENETS, Ye.S.; VYPOV, G.P.

Possibility of floc formation in steel as a result of its brittle dynamic fracture. Fiz. met. i metalloved. 11 no. 1:95-99 Ja '61. (MIRA 14:2)

1. Donetskiy industrial'nyy institut.
(Steel—Metallography)

TOVPENETS, Ye.S., dots., kand.tekhn.nauk

Temper brittleness of pearlitic steel after annealing. Izv.vys.ucheb. zav.; chorn.met. no.11:105-113 N '58. (MIRA 12:1)

1. Donetskiy industrial'nyy institut. Rekomendovano kafedroy metallovedeniya i termicheskoy obrabotki.
(Steel--Brittleness) (Annealing of metals)

TOVPENETS, Ye.S., kand.tekhn.nauk

Cooling forgings made of flake-susceptible steel. Metalloved. i obr.met. no.2:7-13 F '59. (MIRA 12:2)

1. Donetskiy industrial'nyy institut.
(Steel forgings--Cooling) (Steel--Metallography)

SOV/129-59-2-2/16

AUTHOR: Tovpenets, Ye.S., Candidate of Technical Sciences

TITLE: Cooling of Forgings Made of Flocculation-sensitive Steel (Okhlazhdeniye pokovok iz flokenochuvstvitel'noy stali)

PERIODICAL: Metallovedeniye i Termicheskaya Obrabotka Metallov, 1959, Nr 2, pp 7 - 13 (USSR)

ABSTRACT: If large forgings are made from steel which is highly sensitive to flocculation, the cooling is very slow, in some cases lasting 100 to 150 hours and even longer. As a result of work described in this paper, a fluctuating cooling regime (see graph, Figure 1) was evolved for forgings made of steel with a high sensitivity to flocculation and it is shown that application of this regime accelerates transformation of super-cooled austenite and permits eliminating rejects caused by flocculation. In earlier work (Ref 6), the author and his team have shown that it is advisable to use a fluctuating cooling regime not only for large forgings but also for rolled material. Literary data and practical results obtained in recent years (Refs 6-9) confirm the effectiveness of the fluctuating cooling regime for preventing flake formation and the superiority of such cooling as compared with slow

Card1/4

Cooling of Forgings Made of Flocculation-sensitive Steel

or isothermal cooling. At the Novo-Kramatorskiy mashinostroitel'nyy zavod im. Stalina (Novo-Kramatorsk Engineering Works imeni Stalin) large forgings are now being cooled in accordance with the fluctuating temperature regime as shown in the graph, Figure 2. The total duration of the cooling process is 72-170 hours, including all the cycles of temperature rise and temperature fall. The author believes that for flocculation-sensitive steels that cooling regime is most favourable which ensures full completion of the decomposition of the austenite within the shortest possible time in a temperature range in which there is not only a maximum elimination of the hydrogen but also formation of decomposition products with the highest activity. Practical experience has shown that these conditions are not satisfied by slow cooling, nor by the isothermal regime with stoppage of the cooling in the temperature range corresponding to the first maximum of the speed of decomposition of the super-cooled austenite. In the case of applying cooling in accordance with the fluctuating temperature regime, the decomposition of the super-cooled austenite will be completed in two to three

Cooling of Forgings Made of Flocculation-sensitive Steel

stages, as follows: during cooling to a selected super-cooling temperature and holding at that temperature; during subsequent heating from the super-cooling temperature to the Ac_1 temperature and holding at that temperature; during the final cooling from the Ac_1 temperature. The process of decomposition of the austenite, in the case of applying such a cooling regime with accelerated super-cooling, is discussed in detail for steels of the type 35KhNM. The following conclusions are arrived at: the fluctuating regime has considerable advantages as compared with the isothermal regime and ordinary slow cooling. If the fluctuating regime of cooling is used the beginning of the decomposition of the super-cooled austenite will occur in the range of intermediate temperatures and the decomposition will be completed at elevated temperatures in a range where the decomposition products have a high ductility. Furthermore, application of such cooling enables removal of the entire excess of dissolved hydrogen at elevated temperatures, improving the uniformity of the microstructure

Cooling of Forgings Made of Flocculation-sensitive Steel

of the steel and thus improving the mechanical properties; it also enables reducing the necessary furnace capacity. There are 5 figures and 12 references, 10 of which are Soviet and 2 German.

ASSOCIATION: Donetskiy industrial'nyy institut (Donets Industrial Institute)

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TOVPENETS, Ya.S.; ZARUYEV, V.M.; GONCHARENKO, N.I.; BABIY, A.S.

Effect of heat treatment over the heating needed for rolling on the mechanical properties of mine rails. Izv.vys.ucheb.zav.; met. no.4:145-152 '60. (MIRA 13:4)

1. Donetskiy industrial'nyy institut.
(Railroads--Rails) (Steel--Heat treatment)

SOV/133-59-4-22/32

AUTHORS: Tovpenets, Ye.S., Candidate of Technical Sciences, Goncharenko, N.I., Candidate of Technical Sciences, Babiy, A.S., Engineer, and Shcherbina, G.Z., Engineer

TITLE: Improvement of Mechanical Properties of Reinforcing Bars by Thermal Treatment (Povysheniye mekhanicheskikh svoystv armaturnoy stali posredstvom termicheskoy obrabotki)

PERIODICAL: Stal', 1959, Nr 4, pp 364-367 (USSR)

ABSTRACT: The possible degree of improvement of mechanical properties of St5 steel by thermal treatment and optimum conditions of such treatment were studied. Specimens from 5 heats were taken for the investigation (chemical composition - table 1). Parallel specimens were prepared from the usual rods and from rods which passed thermal treatment according to one of the following seven modifications, °C (in brackets - duration of cooling in water - seconds).

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I	II	III	IV	V	VI	VII
800	800	850	850	900	900	900
(3)	(9)	(5)	(9)	(3)	(9)	(12)

After hardening the rods were annealed at 500, 600, 650, 670 and 690°C. In addition a part of the rods was hardened in water after electric heating (by resistance) to 820 to 850°C and from the temperature of the end of rolling with subsequent annealing at 650°C (the duration of cooling of rods 10 to 12 and 28 mm in diameter on hardening in water was 6 and 20 seconds respectively). The duration of electric heating of rods 12 mm in diameter did not exceed 2-3 minutes at a current of 1200 to 2100 a and 12 v. Tests for strength were done at room temperature and tests for bending and impact strength also at sub zero temperatures. The macro-structure was studied on impact strength specimens in the place of the break. The experimental results are given in tables and figures. It was found that mechanical properties of reinforcing profiles from low

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carbon steel St 5 can be substantially improved by hardening with high temperature annealing (not only the tensile and yield strength are improved but also the impact strength particularly at low testing temperatures (up to -60°C see table 3). The influence of welding on the mechanical properties of thermally treated metal is non-uniform and depends on the method of welding (electric arc welding completely removes the improvement of mechanical properties obtained by the heat treatment while butt welding only partly removes the beneficial influence of heat treatment). The technico-economic effect of thermal treatment (table 4) with hardening from the temperature at the end of rolling is somewhat lower than on hardening from special heating to 850°C (particularly in respect of impact strength).

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There are 5 figures, 4 tables and 6 Soviet references.

ASSOCIATION: Donetskiy Industrial'nyy Institut i Yenakiyevskiy Metallurgicheskiy Zavod (Donetsk Industrial Institute and the Yenakiyevo Metallurgical Works)

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SOV/137-57-10-19648

Translation from: Referativnyy zhurnal, Metallurgiya, 1957, Nr 10, p 169 (USSR)

AUTHOR: Tovpenets, Ye.S.

TITLE: On the Problem of Controlled Cooling (Annealing) for Prevention of Flakes in Rolled and Forged Components Made of Steel Susceptible to Flake Formation [K voprosu okhlazhdeniya (otzhiga) i kontrolya na flokeny prokata i pokovok iz flokenochuvstivitel'noy stali]

PERIODICAL: Tr. Donetsk. industr. in-ta, 1957, Vol 19, pp 37-46

ABSTRACT: The author outlines some theoretical principles underlying a method of alternate cooling (annealing) of components made of steel susceptible to flakes. The method consists of the following procedures: 1) Cooling of the article from the temperature at which it was worked under pressure to a temperature of 100-650°C (depending on the degree of alloying of the steel); 2) heating to 820-870°, followed by soaking and accelerated cooling to a temperature of 200-300°; 3) reheating to 650°, soaking of the article at this temperature for a certain period of time,

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followed by final cooling. The technology described ensures most rapid and complete transformation of supercooled austenite at temperatures 20 to 50° below the Ac_1 point and prevents the formation of flakes in the steel. A number of practical suggestions for realization of the technology outlined above are given. Bibliography: 23 references.

M.Ch.